PolyGard® GC- 06

Digital Gas Controller Series

User Manual

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Software Controller from version 1.00.07

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Digital Gas Controller GC-06

1 Application Intended for Use

The PolyGard® GC-06 Gas Controller is used for monitoring, detection and warning of toxic and combustible gases and vapours in the ambient air. The GC-06 Gas Controller fulfils the requirements according to the European Standard EN 50545-1 for the stationary monitoring of carbon monoxide (CO), nitrogen dioxide (NO_2) and combustible gases in underground garages, tunnels, go-cart race courses etc. The GC-06 Gas Controller also meets the requirements according to EN 378, VBG 20 and the guidelines "Safety requirements for ammonia (NH_3) refrigeration systems". The Gas Controller can be used as well for monitoring other gases and measuring values.

The intended sites are all areas being directly connected to the public low voltage supply, e.g. residential, commercial and industrial ranges as well as small enterprises (according to EN 5502). The Gas Controller may only be used in ambient conditions as specified in the Technical Data.

The PolyGard® Gas Controller GC-06 must not be used in potentially explosive atmospheres.

2 Description

The Gas Controller is a measuring, warning and control system for the continuous monitoring of different toxic or combustible gases and vapours as well as of Freons refrigerants. The GC-06 is suitable for the connection of up to 96 digital sensors like the PGSB_03 series via the 2-wire bus. Up to 32 analog inputs for the connection of sensors with 4 to 20 mA signal interface are available in addition. The controller can be employed as pure analog controller, as analog/digital or as digital controller. The total number of connected sensors, however, may not exceed 128 sensors.

Up to four programmable alarm thresholds are available for each sensor. For binary transmission of the alarms there are up to 32 relays with potential-free change-over contact and up to 96 signal relays.

Comfortable and easy operation of the Gas Controller is done via the logical menu structure. A number of integrated parameters enables the realisation of various requirements in the gas measuring technique. Configuration is menu-driven via the keypad. For fast and easy configuration, you can use the PC based configuration software **DGC-EasyConf**.

Prior to commissioning please consider the guidelines for wiring and commissioning of the hardware.

2.1 Normal Mode

In normal mode, the gas concentrations of the active sensors are continuously polled and displayed at the LC display in a scrolling way. In addition, the controller continuously monitors itself, its outputs and the communication to all active sensors and modules.

2.2 Alarm Mode

If the gas concentration reaches or exceeds the programmed alarm threshold, the alarm is started, the assigned alarm relay is activated and the alarm LED (orange for alarm 1, red for alarm 2 + n) starts to flash. The set alarm can be read from the menu Alarm Status. When the gas concentration falls below the alarm threshold and the set hysteresis, the alarm is automatically reset. In latching mode, the alarm has to be reset manually directly at the alarm triggering device after falling below the threshold. This function is obligatory for combustible gases detected by catalytic bead sensors generating a falling signal at too high gas concentrations.

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2.3 Special Status Mode

In the special status mode there are delayed measurements for the operation side, but no alarm evaluation. The special status is displayed on the display and it always activates the fault relay.

The controller takes the special status when:

- faults of one or more active devices occur
- the operation starts up after return of voltage (power on)
- the service mode is activated by the user
- the user reads or changes parameters
- an alarm or signal relay is manually overridden in the alarm status menu or via digital inputs.

2.3.1 Fault Mode

If the controller detects an incorrect communication of an active sensor or module, or if an analog signal is outside the admissible range (< 3,2 mA > 21,6 mA), or if there are internal function errors coming from the self-control modules incl. watchdog and voltage control, the assigned fault relay is set and the error LED starts to flash. The error is displayed in the menu Error Status in clear text. After removal of the cause, the error message has to be acknowledged manually in the menu Error Status.

2.3.2 Restart Mode (Warm-up Operation)

Gas sensors need a running-in period, until the chemical process of the sensor reaches stable conditions. During this running-in period the sensor signal can lead to an unwanted release of a pseudo alarm.

Depending on the connected sensor types, the longest warm-up time has to be entered as power-on time in the controller. This power-on time is started at the Gas Controller after switching on the power supply and/or after the return of voltage. While this time is running out, the Gas Controller doesn't display any values and doesn't activate any alarms; the controller system isn't yet ready for use.

The power-on status occurs on the first line of the starting menu.

2.3.3 Service Mode

This operation mode includes commissioning, calibration, testing, repair and decommissioning.

The service mode can be enabled for a single sensor, for a group of sensors as well as for the complete system. In active service mode pending alarms for the concerned devices are held, but new alarms are suppressed.

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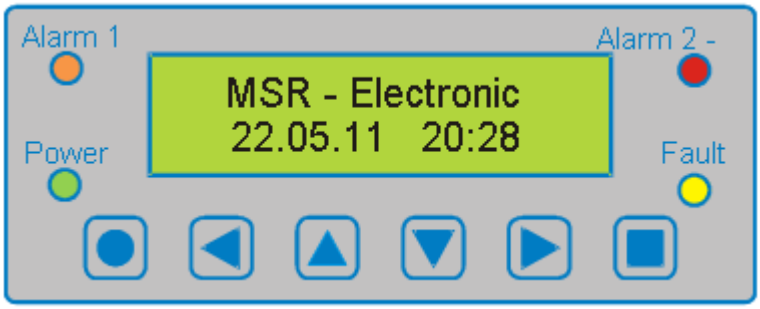
3 Operating Instruction

The complete configuration, parameterization and service are made via keypad user interface in combination with the LC display screen. Security is provided via four password levels against unauthorized intervention.



3.1 Function of the Keys and LEDs at the Keypad

Exits programming, returns to the previous menu level.

Enters sub menus, and saves parameter settings.

Scrolls up & down within a menu, changes a value.

Moves the cursor position.

LED orange: Flashes when alarm one or more alarms are active.

LED red: Flashes when alarm two or more alarms are active.

LED yellow: Flashes at system or sensor failure or when maintenance date exceeded or in voltage-free status with the option power failure flashing light.

LED green: Power LED

3.2 Setting / Changing of Parameters and Set Points

Open desired menu window.
Code input field opens automatically, if no code is approved.

After input of valid code the cursor jumps onto the first position segment to be changed.

Push the cursor onto the position segment, which has to be changed.

Set the desired parameter / set point with the keys.

Save the changed value, confirm storage (ENTER).

Cancel storage / close editing / go back to next higher menu level (ESCAPE function).

3.3 Code Levels

According to the regulations of all national and international standards for gas warning systems, all inputs and changes are protected by a four-digit numeric code (= password) against unauthorised intervention. The menu windows of status messages and measuring values are visible without entering a code.

The release of a code level is cancelled if no button is pushed within 15 minutes.

The code levels are classified in order of priority: Priority 1 has top priority.

Priority 1: (code not changeable)

Code level priority 1 is intended for the service technician of the installer to change parameters and set-points. This password allows working on all settings. For opening the parameter menus you must first activate the service mode after code release.

Priority 2: (code not changeable)

With code level 2, it is possible to lock / unlock transmitters temporarily. This password is only given to the end user by the installer in problem situations. In order to lock / unlock the sensors you must first activate the service mode after code release.

Priority 3: (code is settable in the system menu)

It is only intended to update the maintenance date. To access to the menu maintenance date you must first activate the service mode. Normally the code is only known by the service technician. It can be changed individually via priority 1.

Priority 4: (password 1234) (code not changeable)

Code level priority 4 allows the operator:

- to acknowledge faults
- to set date and time
- to configure and to operate the data logger option,

after activation of the operation mode “Service Mode”:

- to read all parameters
- to manually operate test function of the alarm relays (functional test of the connected units)
- to manually operate test function of the analog outputs (functional test of the connected units)

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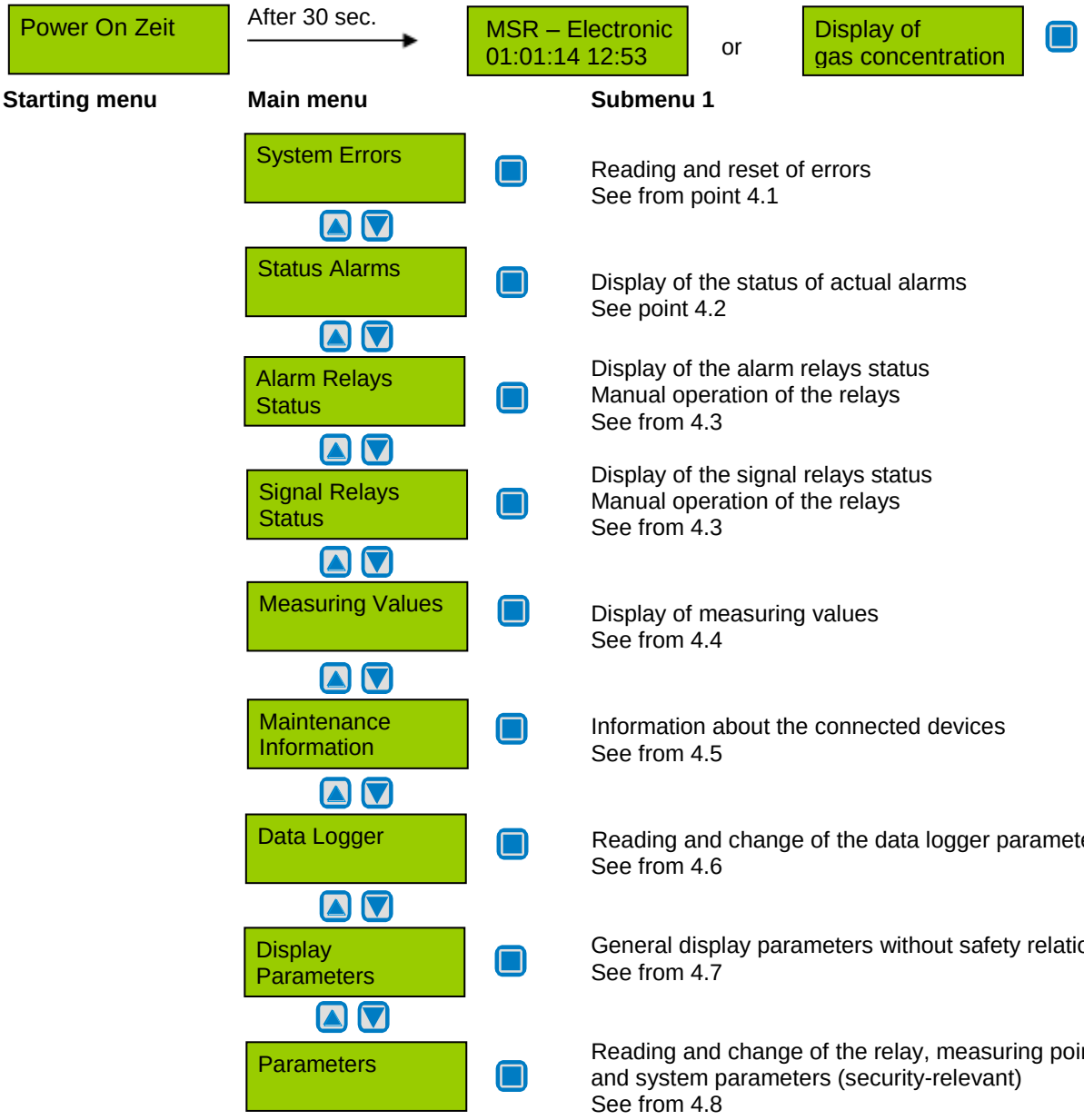
4 Menu Overview

The Gas Controller GC-06 is operated via a clear, intuitive and logical menu structure. The operating menu contains the following levels:

- Starting menu with date and time if no MP is registered, otherwise scrolling display of the gas concentrations of all registered sensors in 5-second intervals. If alarms are active, only the values of the sensors currently in alarm status are displayed.
- Main menu
- Submenu 1 to 3



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4.1 Fault Management

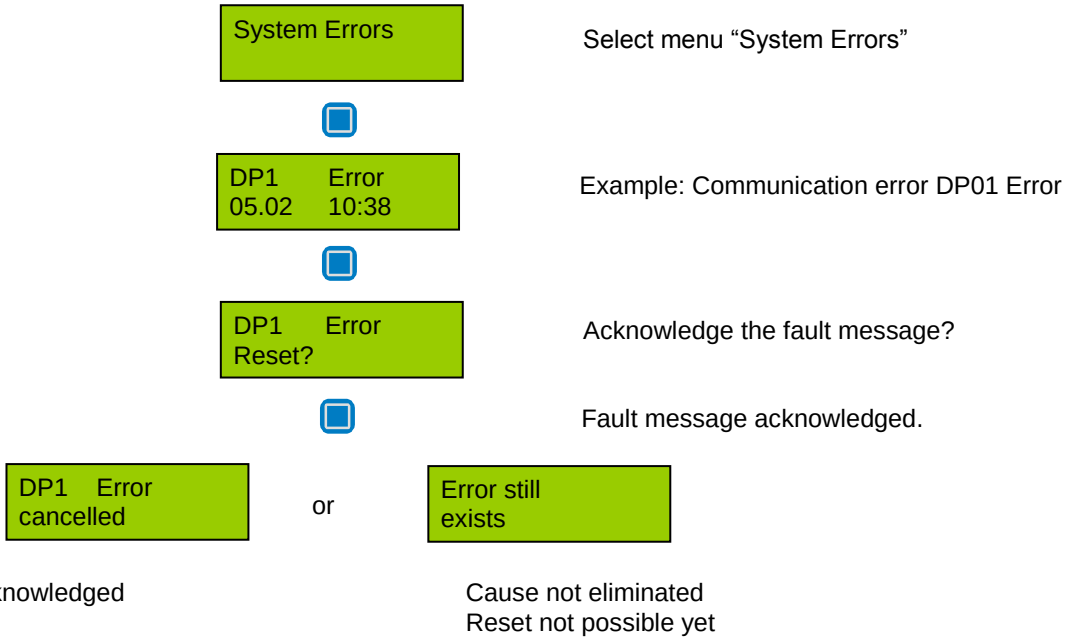
The integrated fault management records the first 50 faults with date and time stamps in the menu „System Errors“. Additionally a record of the faults occurs in the “Error memory”, which can only be read and reset by the service technician.

A pending fault activates the fault indication relay. The yellow LED (Fault) starts to flash and the fault is displayed in plain text with date and time in the starting menu.

In case of the fault of a connected sensor the alarms defined in the menu “MP Parameter” are activated in addition.

4.1.1 Acknowledge a Fault

Attention:
According to the directives of the gas measuring technique, accumulated errors are allowed to be acknowledged automatically. Acknowledgment of a fault is only possible after having removed the cause!



4.1.2 Error Memory

The menu „Error Memory“ in the main menu “System Error” can only be opened via the code level priority 1.

In the error memory, the 50 first faults already acknowledged in the menu “System Error” are listed for the service technician in a power failure safe way.

Attention:

This memory should always be read during maintenance, relevant faults should be tracked and entered in the service logbook, and finally the memory should be emptied.

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4.1.3 System Messages and Errors

The devices connected via the analog interface can only report their malfunction by signal underrange or overrange. The reason for signal underrange mostly comes from bad, wrong or missing signal wiring that is the error reason.

The following system error messages of the analog interface are detected are recorded.

AP 0X Overrange	Current signal at analog input > 21.2 mA
Cause:	Short-circuit at analog input, analog sensor not calibrated, or defective.
Solution:	Check cable to analog sensor, make calibration, replace sensor.
AP Underrange	Current signal at analog input < 3.2 mA
Cause:	Wire break at analog input, analog sensor not calibrated, or defective.
Solution:	Check cable to analog sensor, make calibration, replace sensor.

Any device with microprocessor and digital communication - such as digital heads, sensor boards, EP modules and even the controller - is equipped with extensive self-monitoring systems and diagnostic functions.

They enable detailed conclusions about the error causes and help the installers and operators to quickly determine the cause, and/or to arrange an exchange.

These errors can only be transmitted when the connection to the central (or tool) is intact.

DP 0X Sensor Element	(0x01) Sensor element at the sensor head – diagnostic function reports error.
Cause:	Sensor pins broken, mechanical or electrical damage.
Solution:	Exchange sensor head.
DP 0X AD-Converter	(0x02) Monitoring of the amplifier and AD converter circuits at the input Device reports an error.
Cause:	Mechanical or electrical damage of the amplifiers.
Solution:	Replace device.
DP 0X Voltage Control	(0x04) Monitoring of the sensor and/or process power supply Device reports an error.
Cause:	Mechanical or electrical damage of the power supply.
Solution:	Measure tension if too low, replace device.
DP 0X Processor Error	(0x08) Monitoring of the processor function – reports an error.
Cause:	Mechanical or electrical damage of the processor.
Solution:	Replace device.
DP 0x EEPROM Error	(0x10) Monitoring of the data storage – reports an error.
Cause:	Electrical damage of the memory or configuration error.
Solution:	Check configuration, replace device.
DP 0X In/Out Error	(0x20) Power ON or monitoring of the in/outputs of the processor reports an error.
Cause:	During restart, electrical damage of the processor or of circuit elements.
Solution:	Wait until Power On is over, replace device.

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DP 0X Overrange	(0x200) Signal of sensor element at the sensor head is out of range.
Cause:	Sensor not calibrated correctly (e.g. wrong calibration gas), defective.
Solution:	Recalibrate sensor, replace it.
DP 0X Underrange	(0x100) Signal of sensor element at the sensor head is out of range.
Cause:	Wire break at sensor element input, sensor drift too high, defective.
Solution:	Recalibrate sensor, replace it.

The controller monitors the communication between request and response. If the reply is too late, incomplete or incorrect, the controller recognizes the following errors and reports them.

DP 0X Error	(0x1000) Communication error of head to DP 0X sensor
	(0x2000) Communication error of controller to DP 0X sensor
Cause:	Bus line interrupted or short circuit, DP 0X registered at the controller, but not addressed or wrong gas type or measuring range. DP 0X defective.
Solution:	Check line to DP 0X, check sensor address or parameters, replace sensor.
EP_06 0X Error	(0x2000) Communication error to EP_06 0X module
Cause:	Bus line interrupted or short circuit, EP_06 0X registered at the controller, but not addressed or addressed incorrectly. EP_06 0X module defective.
Solution:	Check line to EP_06 0X, check module address, replace module.

Maintenance:	System maintenance is necessary.
Cause:	Maintenance date exceeded.
Solution:	Perform the maintenance.

DP XX locked **AP XX locked:**	This MP input is locked (MP is physically present, but cancelled by the operator)
Cause:	Operator intervention.
Solution:	Eliminate the cause of a possible fault and then unlock the MP.

4.2 Status Alarm

Display of the currently pending alarms in plain text in the order of their arrival. Only those measuring points are displayed, where at least one alarm is active. The alarms are generated either in the controller (alarm) or directly on site in the sensor / module (local alarm).
Changes are not possible in this menu.

Main menu **Submenu** **1**

Symbol	Description	Function
AP X	Measuring Point No.	Analog measuring point X = 1 - 32, where an alarm is pending.
DP X	Measuring Point No.	Digital measuring point X = 1 - 96, where an alarm is pending.

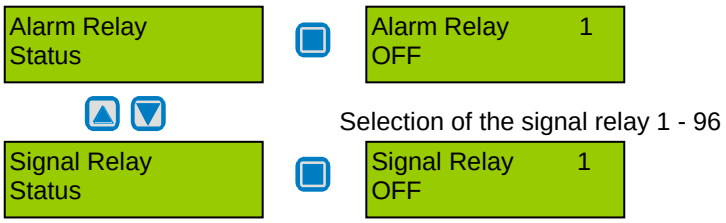
LA1 A1	Alarm status	LA1 = Local alarm 1 active (generated in the sensor / module) A1 = Alarm 1 active (generated in the central control)

4.3 Status Relay

Reading of the current status of alarm and signal relays.
The manual operation of the alarm and signal relays is done in the menu Parameters.

Main menu **Submenu 1**

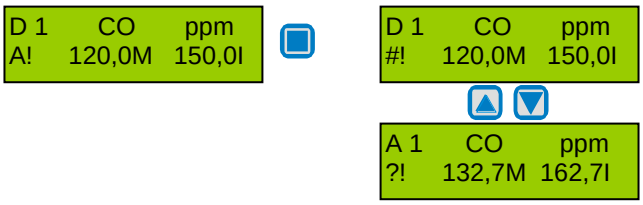
Selection of the alarm relay 1 – 32



4.4 Menu Measuring Values

In this menu, the display shows the measuring value with gas type and unit. If the alarm evaluation is defined via the average, the display shows the current value (C) and additionally the average value (A).

Main menu **Submenu 1**



Symbol	Description	Default	Function
DX	Measured value		Measured value from bus sensor with MP address with X = 1 - 96
AX	Measured value		Measured value from analog sensor at analog input with AX = 1 - 32
CO	Gas type		See 4.7.3
ppm	Gas unit		See 4.7.3
A	Average value		Arithmetic average (30 measured values within the time unit)
C	Current value		Current value of gas concentration
A!	Alarm		MP has triggered an alarm
#	Maint. info		Device has exceeded maintenance date
?	ConfigError		MP configuration not compatible
Error	Fault MP		Communication error, or signal out of the measuring range
Locked	MP locked		MP was temporarily locked by the operator, not shown.

The information ConfigError has priority to maintenance information.

Alarm information is always displayed with „!“, even if ConfigError or maintenance information are active.

4.5 Maintenance Information

A control of the maintenance intervals required by law (SIL) or by the customer is integrated in the GC-06 system. It is implemented with two different maintenance types.

System maintenance message:

At commissioning or after successful maintenance, the date (battery backed) for next due maintenance of the whole system has to be entered. When this date has been reached, the maintenance message is activated.

Sensor maintenance message:

Sensors need regular calibration for complying with the specified accuracy and reliability. In order to avoid complex manual documentation, the sensors store their operating time between the calibration intervals continuously and permanently. If the operating time exceeds the sensor maintenance interval stored in the sensor, a maintenance message is sent to the central control.

The maintenance message is reset during calibration and the operating time is set to zero.

Device reaction with pending maintenance message:

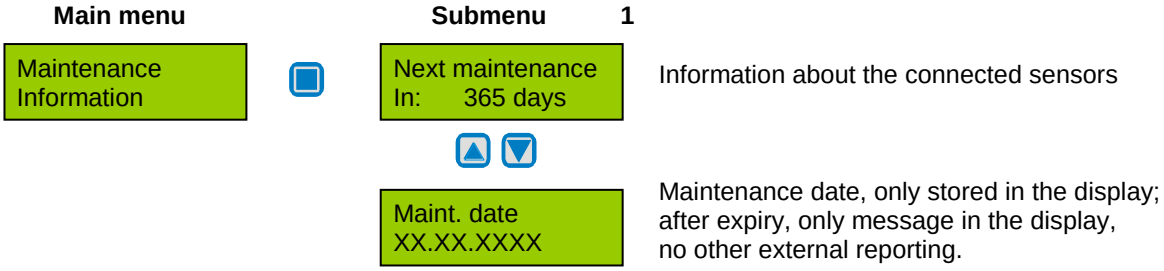
The maintenance signal can be ORed to each of the active relays in the relay parameter menu. In this way, one or more relays can be activated with the maintenance.

With a pending maintenance message, the phone no. of the service company appears in the main menu instead of the time / date information and the yellow LED on the display starts to flash.

The acknowledgment of the maintenance indication (but not the maintenance message) is possible by pressing the left (ESC) key. If the maintenance isn't performed, the message will reappear after one week in order to remind the operator of the due maintenance.

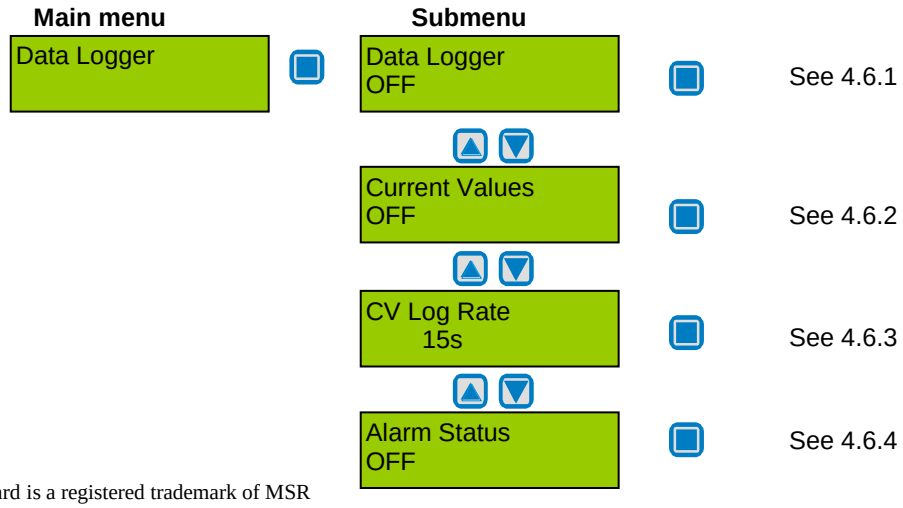
In order to distinguish between the sensor maintenance messages or the system maintenance message and to get a quick assignment of serviceable sensors, the measured value in the menu item "Measured Values gets the prefix "#" for marking as maintenance sign.

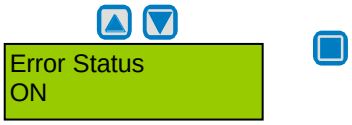
As additional information, a separate window displays the time (in days) when the next sensor is due for maintenance. If several sensors are connected, the shortest time is always displayed.
The largest representable number is 889 days (127 weeks / 2.5 years). If the next maintenance is due in an even longer period, the time display is still limited to 889 days.


Main menu
Submenu 1
Maintenance Information
Next maintenance In: 365 days
Information about the connected sensors
Maint. date XX.XX.XXXX
Maintenance date, only stored in the display; after expiry, only message in the display, no other external reporting.

4.6 Menu Data Logger

Connect an USB device at the USB cable to use the data logger function.
This USB device may be for example an USB stick version 2.0 (not all types have been tested).
In this menu, the parameters for the long-term recording of the USB device are set.





See 4.6.5

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4.6.1 Data Logger Switch On / Off

Starting the logger function.

Symbol	Description	Setting Status	Function
OFF	Turned off	OFF	OFF = Data Logger function is turned off ON = Data Logger function is turned on

Note:

This function only works with an USB device.

If this function is active, the USB device mustn't be removed, otherwise data may be lost!! (Like with Windows – safe removal of USB devices)

4.6.2 Current values

Symbol	Description	Setting Status	Function
OFF	Current value	OFF	OFF = Current values of all registered MP are **not** recorded. ON = Current values of all registered MP are recorded.

Release of the current value recording of all active measuring points on the USB device in a CSV file. The file name is generated by the system and can't therefore be determined manually.

The name of the file is structured as follows:

CVMMTT.csv, with MM standing for the current month and TT standing for the current day.

Every day, a new file with the current date is generated. This makes sure that the files won't be too big to be still edited by established PC programs.

Internal structure of the file
(The headlines and column numbers are only for easy explanation and aren't written in the file!)

Column 1	2	3	4	5	6	7	8	9	10	etc.
Time	MP1	MP2	MP3	MP4	MP5	MP6	MP7	MP8	MP9	MP10
Or time	MP1.1	MP1.2	MP2.1	MP2.2	MP3.1	MP3.2	MP4.1	MP4.2	MP5.1	MP5.2
09_50_02	0	20	20	28	0	-	0	0	0	
09_50_03	0	20	20	28	0	-	25	29	0	
09_50_04	0	20	20	28	0	-	25	29	0	
09_50_05	0	20	20	28	0	-	25	29	0	
09_50_06	0	20	20	28	0	-	25	29	0	
09_50_07	0	20	20	28	0	-	25	29	0	
09_50_08	0	20	20	28	0	-	25	29	0	
09_50_09	0	20	20	28	0	-	25	29	0	
09_50_10	0	20	20	28	0	-	25	29	0	
09_50_11	0	20	20	28	0	-	25	29	0	
09_50_12	0	20	20	28	0	-	0	29	0	

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The first column gives the time, from the second column on, the current values of all registered measuring points at this time are written. Inactive measuring points within active measuring points are marked by a dash -.

Values less than 0 stand for an error status of the measuring point.

e.g. 0x0100 = Underrange of head measuring point

e.g. 0x0200 = Overrange of head measuring point

e.g. 0x9000 = Communication error of sensor board measuring point

e.g. 0xB000 = Communication error of head measuring point

Each error is marked by the prefix 0x.

In this way the file keeps a fixed structure and can be evaluated with Excel and graphed according to the chronological sequence.

4.6.3 CV Log Rate

Setting of the time interval in which the current values of all registered MP are stored (in seconds).

Symbol	Description	Setting Status	Function
10s	Time in seconds	10s	Time interval between two entries in the CSV file (10- 9999 sec = approx. 2.7 h)

4.6.4 Alarm Status

Symbol	Description	Setting Status	Function
OFF	Alarm status	OFF	OFF = Alarms aren't stored. ON = Alarms are stored.

Release of the alarm recording for all active measuring points on the USB device into a separate CSV file for alarms and faults.

The name of the file structured as follows:

AEMMTT.csv, with MM standing for the current month and TT standing for the current day.

Every day, a new file with the current date is generated. This makes sure that the files won't be too big to be still edited by established PC programs.

Internal structure of the file
(The headlines are not written in the file!)

Time	MP	Gas	CV/AV	A1	A1R	A2	A2R	A3	A3R	A4	A4R
09_49_47	MP 02	CO	84	40	R01	80	R02				
09_49_47	MP 03	CO	194	40	R01	80	R02	100	R03	120	R04
09_50_02	MP 02	CO	20								
09_50_02	MP 03	CO	20								

The first column gives the time, the second the MP address and the third the gas type.

In the fourth column there is the measured value having caused the alarm activation. The measured value is stored in dependence of the definition in the MP parameter menu as current or average value. In case of average value overlay it is the current value that is stored.

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The fifth column gives the threshold of the first alarm; in the sixth the assigned alarm relay. In this way you can track which relay switches at what threshold. The next column is for the second alarm threshold with the associated alarm relays and so on up to the forth alarm threshold.

If no relay is assigned to an alarm, the corresponding column remains empty.

At every change of an alarm, always all active alarms of the MP are written. The reset of an alarm is documented by an empty column. This shows how long the alarm has been active.

4.6.5 Error Status

Symbol	Description	Setting Stattus	Function
OFF	Error status	OFF	OFF = Faults are **not** stored. ON = Faults are stored.

Release of the fault recording for all active measuring points on the USB device in the common CSV file for alarms and faults.

Internal structure of the file

(The headlines are not written in the file!)

Current time	Source	Error date + time	Error type
10_22_28	MP 79	03_30 10_20	+ MP79 error
13_48_28	MP 79	03_30 13_46	- MP79 error

The first column gives the current time, the second one the error source. The third column indicates the time and date when the error has occurred.

In the fourth column there is the type of error.
+ = Error occurred.
- = Error acknowledged.

Every internal restart of the system (system reset) is also documented in the current day file.

Frequent reboots (several times per day) may point to a technical problem. Please consult the installer as soon as possible.

Info	Date	Time	
DGC05 Reset	30_03_12	13_38_19	

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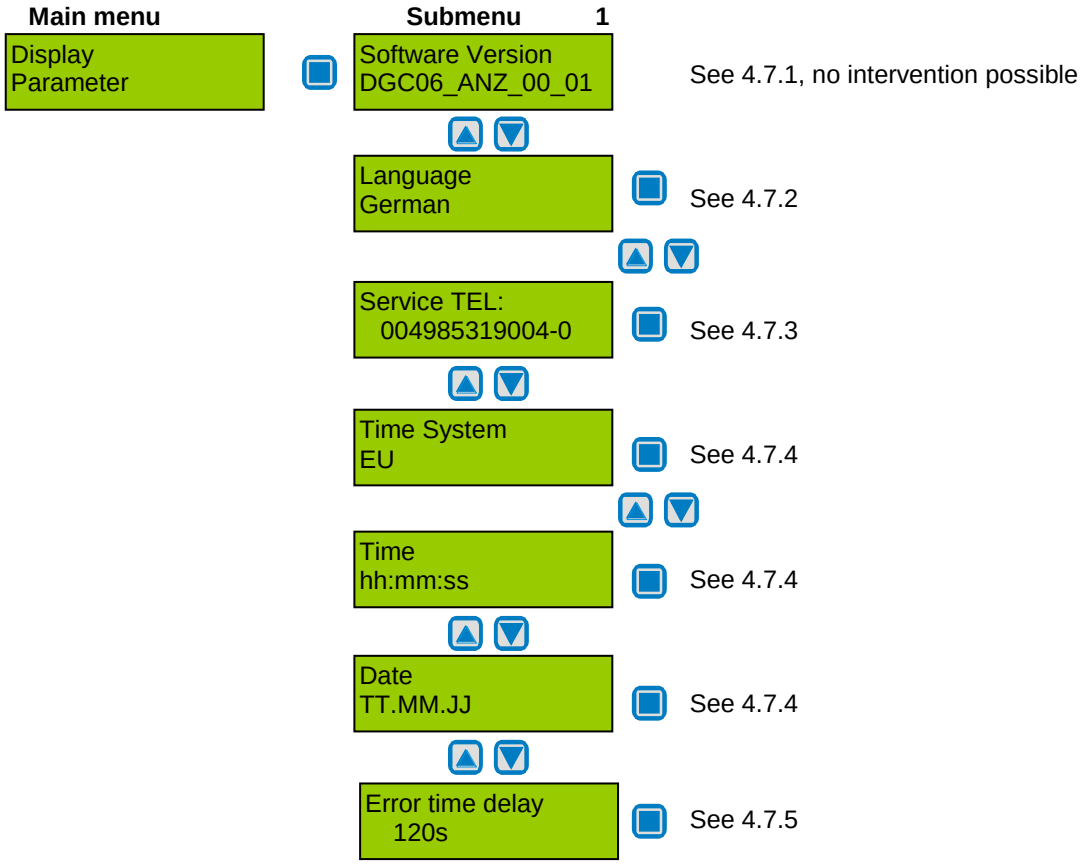
4.7 Display Parameter

In the menu Display Parameter you can find the general, security irrelevant parameters of the gas controller. These parameters can be changed during the operation mode of the controller.



4.7.1 Software Version

Symbol	Description	Default	Function
GC06-ANZ XX	Software Version		XX Software Version

4.7.2 Language

Selection of the menu language.

Symbol	Description	Default	Function
German	Language	German	German English Dutch USA English French Swedish Spanish

4.7.3 Service Phone Number

The service phone no. can be entered individually in the next menu.

Symbol	Description	Default	Function

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0853....	Phone No.		Input of the individual service phone no.

4.7.4 System Time, System Date

Input and correction of time and date. Selection of time and date format

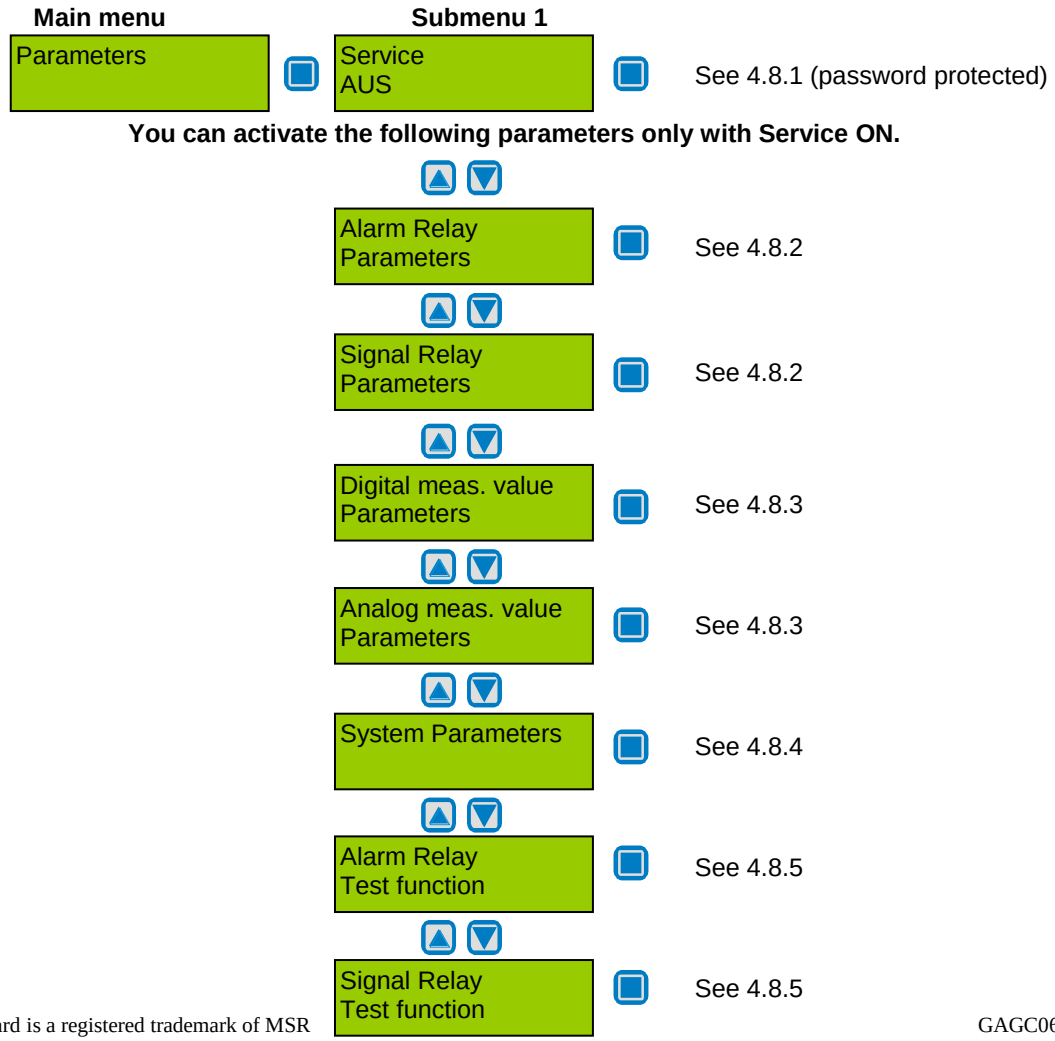
Symbol	Description	Default	Function
EU	Time format	EU	EU = Display of time and date in EU format US = Display of time and date in US format
hh.mm.ss	Time		hh.mm.ss = Input of the correct time (EU format) hh.mm.ss pm = Input of the correct time (US format)
TT.MM.JJ	Date		TT.MM.JJ = Input of the correct date (EU format) MM.TT.JJ = Input of the correct date (US format)

4.7.5 Error Time Delay

Symbol	Description	Default	Function
s	Delay	120s	Definition of a delay time when a communication error is shown on the display.

4.8 Parameters

In the menu Parameters you can find the parameter functions of the gas controller.



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4.8.1 Service

Service and maintenance work mustn't be executed when the gas controller is in the normal measuring mode for it isn't sure that all response times and functions can be observed correctly. For calibration and service work you first have to activate the special status mode on the controller. Only then you are allowed to change the safety related parameters. The special operating mode is activated by, among others, the function service ON.

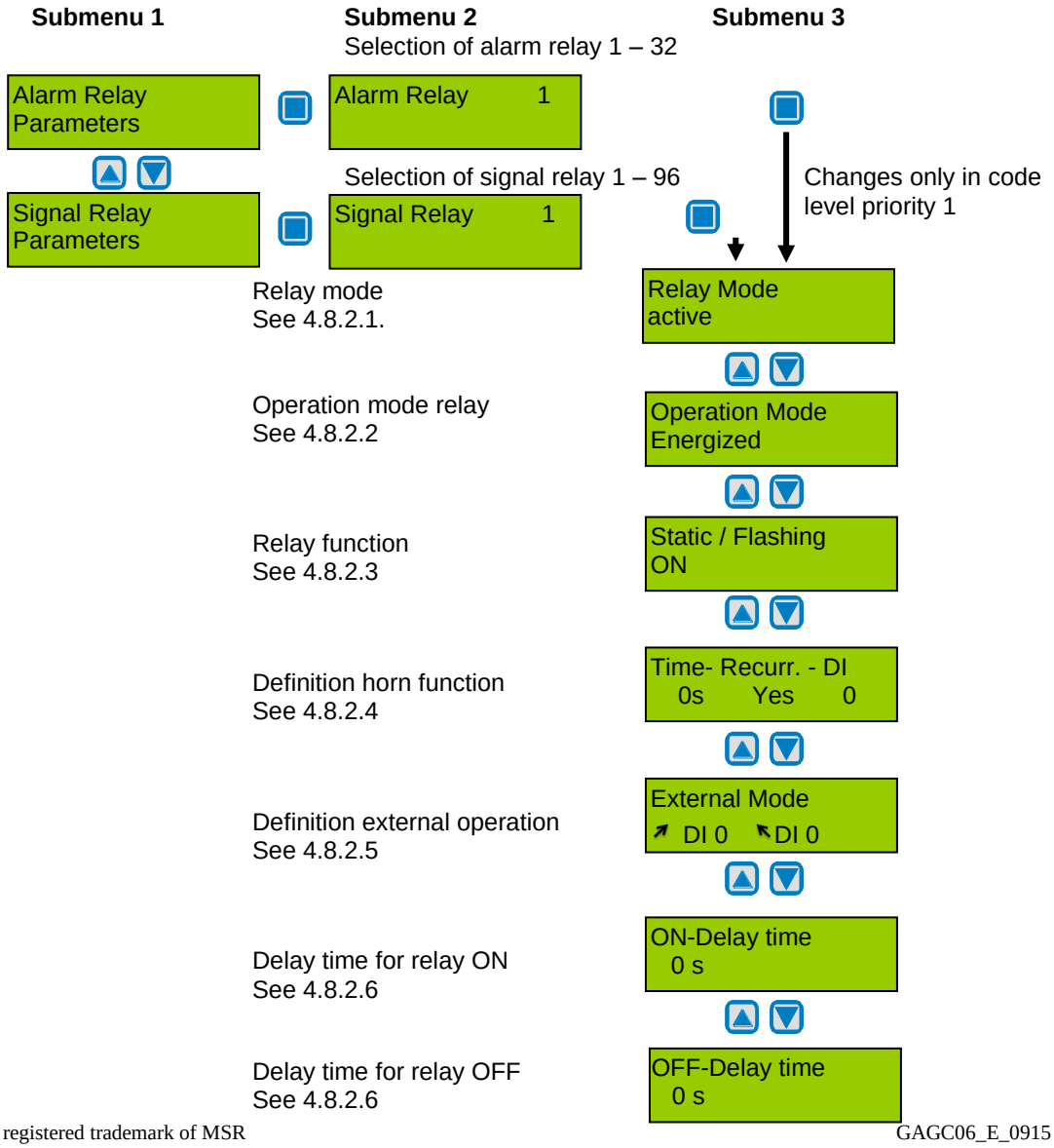
Further parameters menu items are therefore only accessible in the service status ON. The Service Status ON is automatically reset to normal operation mode after 15 minutes after the last key press or manually by the operator in the menu.

Sensors can't be switched into the "special mode" from the controller. This can only be done by tool directly at the sensor. Sensors in the "special mode" are not included in the alarm evaluation.

Symbol	Description	Default	Function
OFF	Service	OFF	OFF = No reading and changing of parameters. ON = Controller in Special status mode, parameters can be read and changed.

4.8.2 Menu Relay Parameter

Reading and changing of the parameters separately for each relay.



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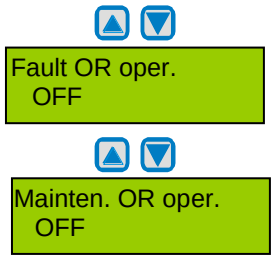

Fault OR operation
See 4.8.2.7

Mainenance OR operation
See 4.8.2.8

4.8.2.1 Relay Modus

Definition of the relay mode

Symbol	Description	Default	Function
active	Mode	active	active = Relay is registered on the controller not active = Relay isn't registered on the controller

4.8.2.2 Relay Operation Mode

Definition of the relay operation mode

The terms energized / de-energized for this item come from the terms open-circuit and closed-circuit principle used for safety circuits. Here, however, not the relay contact circuit is meant (as a changeover contact, optionally available in the two principles), but the activation of the relay coil.

The LEDs attached to the modules show the two states in analogy. (LED off> relay de-energized)

Symbol	Description	Default	Function
De-energ.	Mode	De-energ.	De-energ. = Relay (and LED) de-energized, if no alarm active Energized = Relay (and LED) permanently energized, if no alarm active

4.8.2.3 Relay Function Static / Flash

Definition of the relay function

The function "flashing" represents a connection option for warning devices to improve visibility. If flashing is set, this mustn't be used as a safe output circuit any more.
A combination of relay mode energized with flashing operation makes no sense and is therefore suppressed.

Symbol	Description	Default	Function
ON	Function	ON	ON = Relay function flashing at alarm (= time fixed 1 s) impulse / break = 1:1 OFF =Relay function static ON at alarm

4.8.2.4 Horn Function (not safe output circuit because resettable)

The horn function is considered active if at least one of the two parameters (time or assignment to digital input) is set. The horn function retains its functionality even for alarms in latching mode.

Symbol	Description	Default	Function
Recurrence	Reset mode	0	0 = Reset of the relay after time having run out, via DI (external) or by pushbuttons 1 = After reset of the relay, time starts. At the end of the set time, the relay is activated again (recurrence function).
Time		120	Enter time for function automatic reset or recurrence function in s 0 = no reset function
DI		0	Assignment, which digital input resets the relay.

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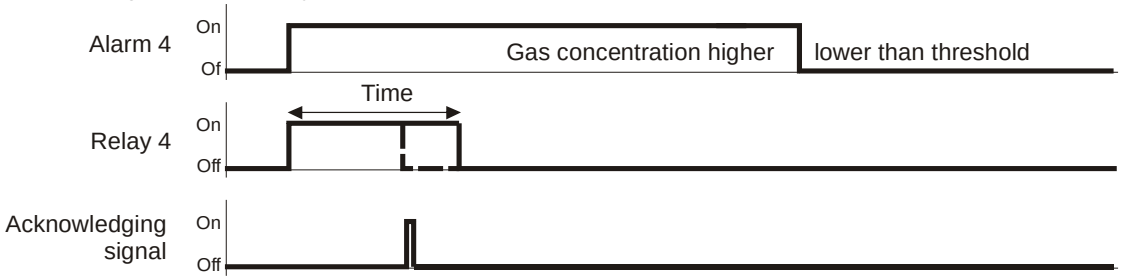
Horn function resettable:
The activated horn can be permanently reset with this function.
The following possibilities to acknowledge are available for the alarm relay as horn relay:

- By pressing the left button (ESC). Only available in starting menu.
- Automatic reset at the end of the preset time (active, if value >0).
- By an external pushbutton. (Assignment of the appropriate digital input DI: 1-n).

After successful acknowledgment the horn remains permanently reset until all assigned alarms for this relay function are inactive again. Only then it is triggered anew in case of an alarm.

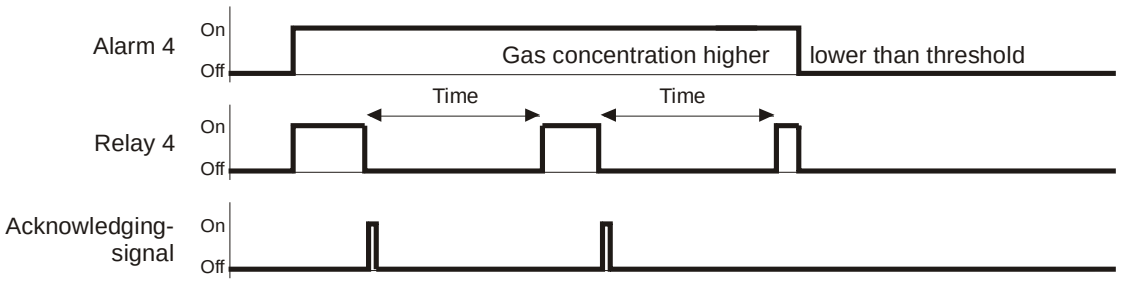
Acknowledge the horn relay



Reset command by timer or one of the operating keys.

Special function Recurrence of the horn relay

After an alarm has been triggered, the horn will remain active until a reset action is done. After acknowledgment of the horn relay/s (clicking a button or via external input) a timer starts. When this time has run out and the alarm is still acting, the relay is set again. This process is repeated endlessly as long as the associated alarm remains active.



Quittierbefehl durch externen Taster oder eine der Bedientasten.

4.8.2.5 External Override of Alarm / Signal Relay via DI

Manual operation of the alarm relays via DI does not trigger the "special mode", as this is a deliberate and configured functionality. The use of the override should be used with caution, particularly the function of setting "external OFF".

Assignment of a digital input (DI) for the external switching on and off of the alarm relay.

This function has priority to gas alarm.

If External ON and External OFF are configured simultaneously to the same relay and both are active at the same time, so in this state, only the External OFF command is executed.

The relays work in this mode, respecting the parameter settings "Static / Flash" and "energized / de-energized".

Symbol	Description	Default	Function
↗ DI 0	External ON	0	As long as DI 0 is closed, relay switches to ON
↘ DI 0	External OFF	0	As long as DI 0 is closed, relay switches to OFF

4.8.2.6 Delay Mode of Alarm Relay

Definition of the switch-on and switch-off delay of the relays

If the latching mode is set for this relay, the respective switch-off delay is without effect.

Symbol	Description	Default	Function
0 s	Switch-ON Delay Time	0	Alarm / Signal Relay is only activated at the end of the defined time. 0 sec. = No delay
0 s	Switch-OFF Delay Time	0	Alarm / Signal Relay is only deactivated at the end of the defined time. 0 sec. = No delay

4.8.2.7 OR Operation of Fault to Alarm / Signal Relay

Enables or disables the Fault OR operation of the current alarm / signal relay.
If the OR operation for this relay is set to active = 1, all device faults will activate the output in addition to the alarm signals.
In practice, this ORing will be used if, for example, fans should run when equipment malfunctions or warning lights should be activated, when the fault message of the central control is not permanently monitored.
Note:
All errors of the measurement point are excepted because the MPs can be assigned to each alarm separately in the menu MP Parameters. This exception is used to build up targeted zone related signaling with MP errors, which should not affect other zones.

Symbol	Description	Default	Function
0	No assignment	0	Alarm and/or signal relay isn't affected if a device fault occurs.
1	Activated assignment	0	Alarm and/or signal relay turns on if a device fault occurs.

4.8.2.8 OR Operation of Maintenance to Alarm / Signal Relay

Enables or disables the Maintenance OR operation of the current alarm / signal relay.
If the OR operation for this relay is set to active = 1, the output will be activated in addition to the alarm signals when at least one maintenance message is pending.
In practice, this ORing will be used if, for example, fans should run when the sensor accuracy isn't ensured anymore because of missing calibration (therefore pending maintenance message) or warning lights should be activated, as the maintenance information of the central control is not permanently monitored.
Note:
Resetting of the activated maintenance message is only possible by calibration of the sensors or by disabling this OR function.

Symbol	Description	Default	Function
0	No assignment	0	Alarm and/or signal relay isn't affected if a maintenance message occurs.
1	Activated assignment	0	Alarm and/or signal relay turns on if a maintenance message occurs.

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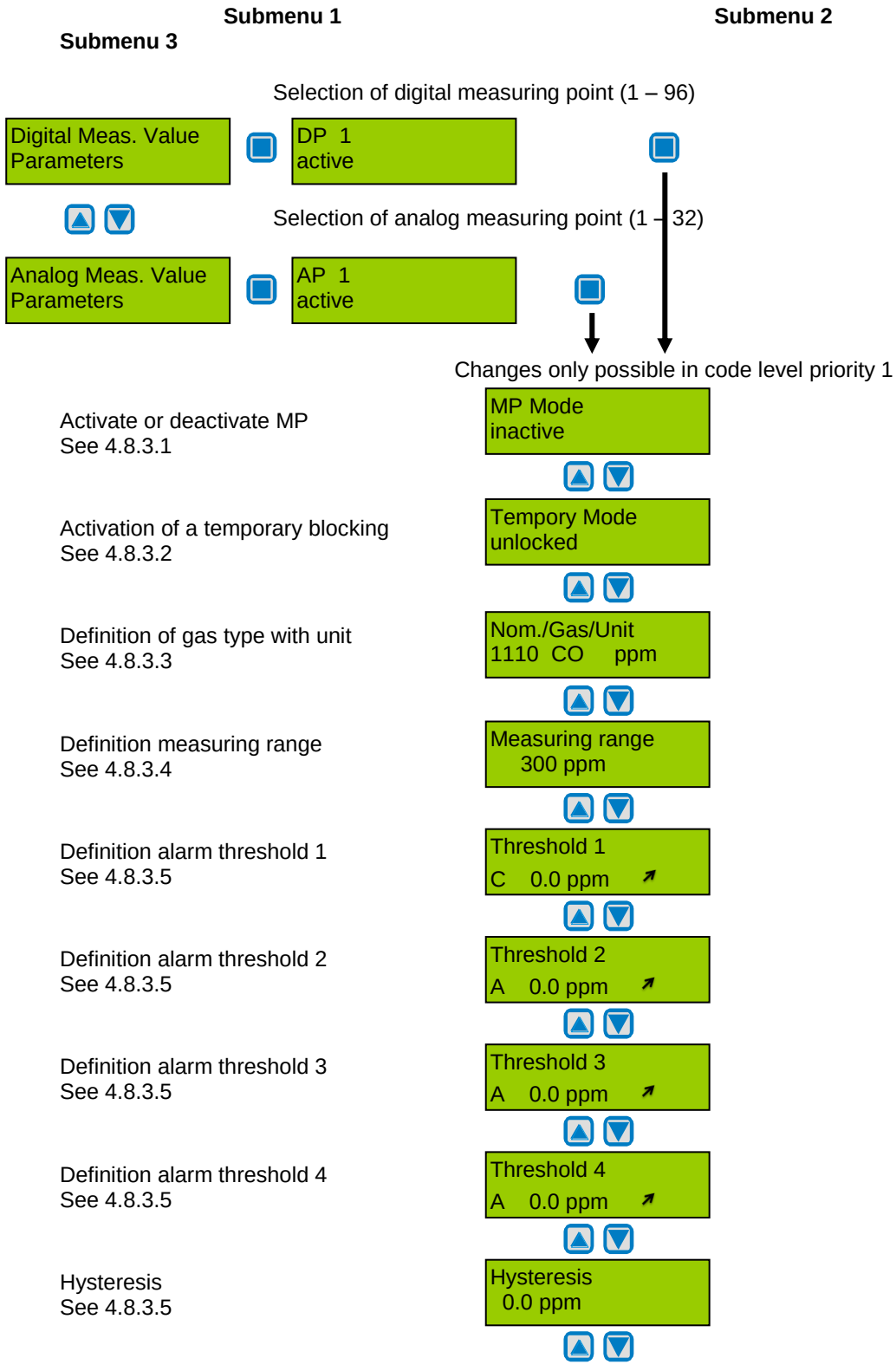
4.8.3 Menu MP Parameters

For reading and changing measuring point parameters for each bus and analog sensor including registration of MP and assignment of the alarm relays.



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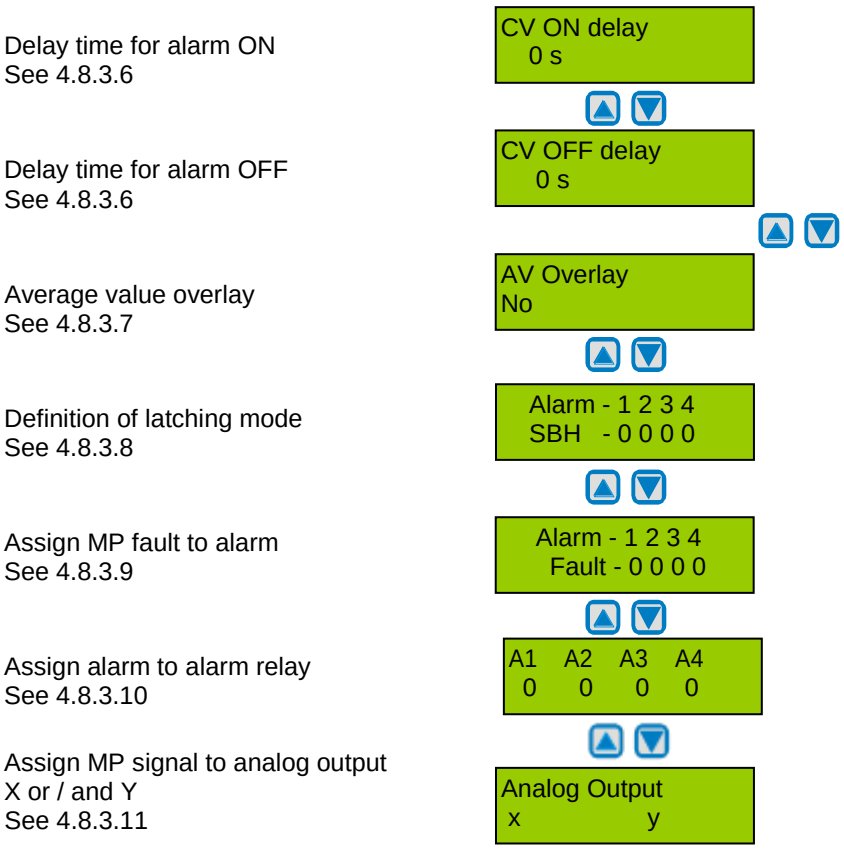

4.8.3.1 Activate – Deactivate MP

Deactivation shuts the registered / not registered sensor down in its function, which means that there is no alarm or fault message at this measurement point. Existing alarms are cleared with deactivation and associated errors can be acknowledged. Deactivated sensors do not output a collective fault message.

Symbol	Description	Default	Function
active	MP Mode	Not active	active = Measuring point activated at the controller. not active = Measuring point not activated at the controller.

4.8.3.2 Lock or Unlock MP

In the temporary Lock Mode, the function of the registered sensors is put out of service, which means that there is no alarm or fault message at this measuring point. Existing alarms are cleared with the locking and the associated errors can be acknowledged. If at least one sensor is blocked in its functionality, the collective fault message is activated after expiry of the internal fault delay time, the yellow fault LED is flashing and a message appears in the menu System Errors.

Symbol	Description	Default	Function
unlocked	Lock mode	unlocked	unlocked = MP free, normal operation locked = MP locked, SSM (collective fault message) active

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4.8.3.3 Selection Gas Type with Unit

Selection of the desired and connected gas sensor type (connection possible as digital sensor cartridge SC, SX or analog measuring signal MC2)

The selection contains all necessary information for the controller, and is also used for comparing the real, digital data with the settings.

This feature increases the user and operating security.
There is an entry available per gas type for each unit; at the moment there are 100 selection options.

MSR Code	Gas Type	Formula	Meas. Range[1]	Unit
1110	Carbon monoxide	CO	0-300	ppm
D110	Carbon monoxide	CO	0-5	% Vol
D110	Carbon monoxide	CO	0-2000	ppm
1130	Nitrogen dioxide	NO_2	0-30	ppm
1129	Nitrogen monoxide	NO	0-100	ppm
1195	Oxygen	O_2	0-25	% Vol
1125	Ammonia	NH_3	0-300	ppm
D164	Carbon dioxide	CO_2	0-2000	ppm
S164	Carbon dioxide	CO_2	0-2000	ppm
D164	Carbon dioxide	CO_2	0-5	% Vol
S164	Carbon dioxide	CO_2	0-5	% Vol
I164	Carbon dioxide	CO_2	0-100	% Vol
3400	Methane	CH_4	0-100	% LEL
I400	IR-Methane	CH_4	0-100	% LEL
I400	IR-Methane	CH_4	0-100	%Vol
3480	Propane	C_3H_8	0-100	% LEL
I480	IR-Propane	C_3H_8	0-100	% LEL
I480	IR-Propane	C_3H_8	0-100	% Vol
3440	Hydrogen	H_2	0-100	% LEL
3408	Ammonia	NH_3	0-100	% LEL
3485	Acetone	$(CH_3)_2CO$	0-100	% LEL
3430	Benzene	C_6H_6	0-100	% LEL
3425	Ethyl alcohol	C_2H_5OH	0-100	% LEL
3427	Ethyl acetate	$CH_3COOC_2H_5$	0-100	% LEL
3410	Ethylene	C_2H_4	0-100	% LEL
3460	n-Butane	C_4H_{10}	0-100	% LEL
3491	n-Heptane	C_7H_{16}	0-100	% LEL
3435	n-Hexane	C_6H_{14}	0-100	% LEL
3445	Isopropyl alcohol	$(CH_3)_2CHOH$	0-100	% LEL
3498	JP8	JP8	0-100	% LEL
3450	Methanol	CH_3OH	0-100	% LEL
3458	Methyl ethyl ketone MEK	C_4H_8O	0-100	% LEL
3470	n-Octane	C_8H1_8	0-100	% LEL

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3475	n-Pentane	C_5H_{12}	0-100	% LEL
3490	Toluene	C_7H_8	0-100	% LEL
3448	Butyl acetate	$C_6H_{12}O_2$	0-100	% LEL
3415	Cyclohexane	C_6H_{12}	0-100	% LEL
3472	Cyclopentane	C_5H_{10}	0-100	% LEL
3420	Ethane	C_2H_6	0-100	% LEL
3465	Isobutane	C_4H_{10}	0-100	% LEL
3476	Isopentane	C_5H_{12}	0-100	% LEL
3402	LPG	LPG	0-100	% LEL
3496	Petrol Vapours	Petrol	0-100	% LEL
3497	Styrene	C_8H_8	0-100	% LEL
3493	Xylene	C_8H_{10}	0-100	% LEL
3495	Acetylene	C_2H_2	0-100	% LEL
C160	VOC	VOC	0-2000	ppm
2189	Ethylene	C_2H_4	0-1000	ppm
2125	Ammonia	NH_3	0-3000	ppm
2053	Xylene	C_8H_{10}	0-300	ppm
D184	Sulphur hexafluoride	SF_6	0-1000	ppm
1135	Bromine	Br_2	0-2	ppm
1192	Nitrous oxide	N_2O	0-2000	ppm
1183	Hydrogen cyanide	HCN	0-100	ppm
1185	Formaldehyde	CH_2O	0-10	ppm
1188	Silane	SiH_4	0-50	ppm
1189	Ethylene	C_2H_4	0-200	ppm
1190	Ozone	O_3	0-200	ppm
1193	Chlorine	CL_2	0-20	ppm
1196	Sulphur dioxide	SO_2	0-100	ppm
1197	Hydrogen sulphide	H_2S	0-200	ppm
1198	Fluorine	F_2	0-2	ppm
1187	Phosphine	PH_3	0-5	ppm
1194	Hydrogen	H_2	0-1000	ppm
1181	Chlorine dioxide	ClO_2	0-1	ppm
1147	Phosgene	$COCl_2$	0-1	ppm
2066	R11	R11		ppm
2059	R12	R12	20-2000	ppm
2070	R22	R22	20-300	ppm
2061	R23	R23	20-2000	ppm
2060	R32	R32		ppm
2064	R123	R123	20-300	ppm
2077	R134a	R134a	20-300	ppm
2063	R1234yf	R1234yf		ppm
2065	R125	R125		ppm

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2071	R401a	R401a	20-2000	ppm
2072	R401b	R401b	20-2000	ppm
2073	R402a	R402a	20-2000	ppm
2074	R402b	R402b	20-2000	ppm
2082	R403a	R403a		ppm
2078	R404a	R404a	20-300	ppm
2083	R407a	R407a		ppm
2080	R407c	R407c	20-300	ppm
2075	R408a	R408a	20-2000	ppm
2076	R409a	R409a	20-2000	ppm
2068	R410a	R410a	20-300	ppm
2067	R411a	R411a	20-300	ppm
2079	R416a	R416a	20-300	ppm
2084	R417a	R417a	20-2000	ppm
2081	R422d	R422d	20-300	ppm
2062	R434a	R434a	20-300	ppm
2069	R507	R507	20-2000	ppm
EXT	TempC	TempC		C
EXT	TempF	TempF		F
EXT	Humidity	Hum.		% RH
EXT	Pressure	Press		mbar
EXT	TOX	TOX		ppm
EXT	Comb.	Comb		% LEL
EXT	External			%
EXT	Digital			%

[1] Different measuring ranges are possible, but not listed here. For details see the sensor datasheets.
[2] Oxygen measurements: Alarm at falling concentration

4.8.3.4 Measuring Range Definition

The measurement range must be adapted to the working range of the connected gas sensor.

For additional control by the installer, the settings in the controller must mandatorily match with the used sensors. If the types of gas and/or measurement ranges of the sensor don't agree with the settings of the controller, the error "EEPROM / configuration error" is generated, and the collective fault message is activated.

The range also affects the display of the measured values, alarm thresholds and hysteresis. For measuring ranges <10 three decimals places, <100 two decimal places, <1000 one decimal place are displayed. For measuring ranges => 1000, the display is without decimal place. The resolution and accuracy of the calculation is not affected by the different measuring ranges.

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4.8.3.5 Threshold / Hysteresis

For each measuring point four alarm thresholds are available for free definition. If the gas concentration is higher than the set alarm threshold, the associated alarm is activated. If the gas concentration falls below the alarm threshold inclusive hysteresis the alarm is again reset. In the mode “Alarm at falling” the corresponding alarm is set in case of falling below the set alarm threshold and reset again when exceeding the threshold plus hysteresis. The display depends on the set measuring range: see 4.8.3.4. Unused alarm thresholds have to be defined at measuring range end point, in order to avoid undesired alarms.

Symbol	Description	Default	Function	Symbol
A	Evaluation	A	A C	A = Alarm evaluation via average value of MP C = Alarm evaluation via current value of MP
80 ppm	Alarm threshold	40 80 100 120 15	Threshold 1 Threshold 2 Threshold 3 Threshold 4 Hysteresis	Gas concentration > Threshold 1 = Alarm 1 Gas concentration > Threshold 2 = Alarm 2 Gas concentration > Threshold 3 = Alarm 3 Gas concentration > Threshold 4 = Alarm 4 Gas concentration < (Threshold X –Hysteresis) = Alarm X OFF
↗		↗		↗= Alarm release at increasing concentrations ↘= Alarm release at falling concentrations

4.8.3.6 Delay for Alarm ON and/or OFF with Current Value Evaluation

Definition of delay time for alarm ON and/or alarm OFF. The delay applies to all alarms of an MP, not with average value overlay, see 4.8.3.7.

Symbol	Description	Default	Function
0 s	CV Alarm ON delay	0	Gas concentration > Threshold: Alarm is only activated at the end of the fixed time (sec.). 0 sec. = No delay
0 s	CV Alarm OFF delay	0	Gas concentration < Threshold: Alarm is only deactivated at the end of the fixed time (sec.). 0 sec. = No delay

4.8.3.7 Average Overlay (VDI 2053 Functionality)

The alarm evaluation of the operation mode “Average” is overridden by the current value, if this exceeds the alarm threshold defined in the menu "System Parameters AV Overlay" (see 4.8.4.4). The overlay is delayed by the time factor entered in the local menu. The function of the average overlay is only evaluated for the gas type CO and is activated here.

Symbol	Description	Default	Function
Yes	AV Overlay	Yes	Yes = Average overlay active (for CO) No = Average overlay not active

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4.8.3.8 Latching Mode Assigned to Alarm

In this menu you can define, which alarms work in latching mode.

Symbol	Description	Default	Function
Alarm - 1 2 3 4 SBH - 0 0 0 0	Latching MP	0 0 0 0	0 = No latching 1 = Latching

4.8.3.9 MP Fault Assigned to Alarm

In this menu you can define, which alarms are activated by a fault at the measuring point.

Symbol	Description	Default	Function
Alarm - 1 2 3 4 Fault - 1 1 0 0	Fault MP	1 1 0 0	0 = Alarm not ON at MP fault 1 = Alarm ON at MP fault

4.8.3.10 Alarm Assigned to Alarm Relay

Each of the four alarms can be assigned to any physically existing alarm relay 1 to 32 or signal relay R1 to R96. Unused alarms aren't assigned to any alarm relay.

Symbol	Description	Default	Function
0	A1 A2 A3 A4	0 0 0 0	RX = Assignment of the alarms A1 - A4 to the signal relays R1-R96 X = Assignment of the alarms A1 - A4 to the alarm relays 1-32

4.8.3.11 MP Signal Assigned to Analog Output

The measuring point signal (current value) can be assigned to one of the max. 16 analog outputs.

The same assignment to different outputs generates a functional duplication. This is often used to control remote devices in parallel (supply fan in the basement, exhaust fans on the roof)

Analog output see also: 4.8.4.8.

Symbol	Description	Default	Function
x y	Analog Output	x y	x = MP Signal is assigned to analog output x. y = MP Signal is assigned to analog output y. 0 = MP Signal isn't assigned to any analog output.

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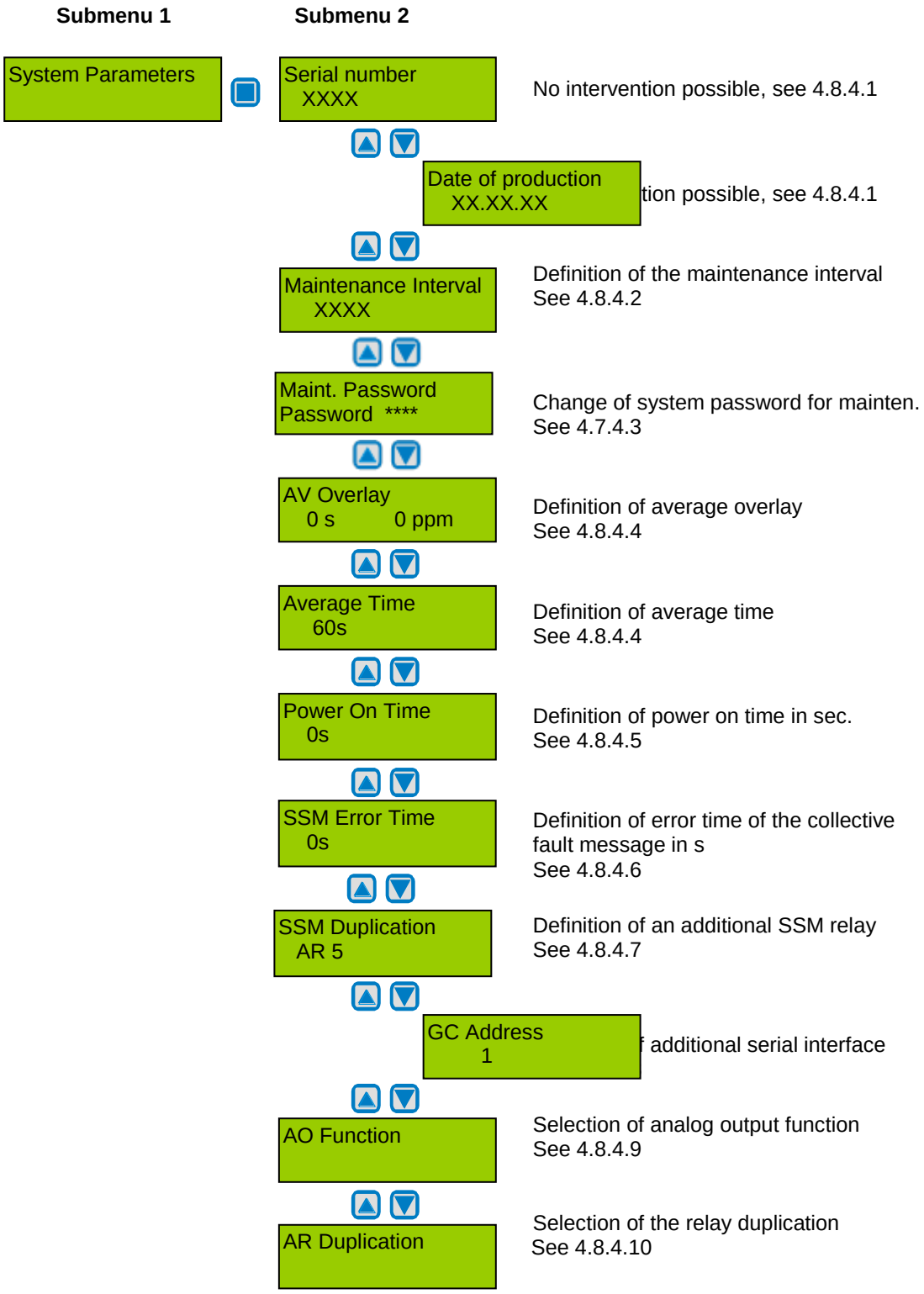
4.8.4 Menu System Parameters


Submenu 1
Submenu 2
System Parameters
Serial number XXXX
No intervention possible, see 4.8.4.1
Date of production XX.XX.XX
tion possible, see 4.8.4.1
Maintenance Interval XXXX
Definition of the maintenance interval See 4.8.4.2
Maint. Password Password ****
Change of system password for mainten. See 4.7.4.3
AV Overlay 0 s 0 ppm
Definition of average overlay See 4.8.4.4
Average Time 60s
Definition of average time See 4.8.4.4
Power On Time 0s
Definition of power on time in sec. See 4.8.4.5
SSM Error Time 0s
Definition of error time of the collective fault message in s See 4.8.4.6
SSM Duplication AR 5
Definition of an additional SSM relay See 4.8.4.7
GC Address 1
f additional serial interface
AO Function
Selection of analog output function See 4.8.4.9
AR Duplication
Selection of the relay duplication See 4.8.4.10

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4.8.4.1 System Information

Symbol	Description	Default	Function
XXXX	Serial number		Serial number
XX.XX.XX	Date of production		Date of production

4.8.4.2 Maintenance Interval

The description of the maintenance concept is shown in 4.5.

The maintenance interval of the controller is set here. If 0 is set, this function is disabled.

Symbol	Description	Default	Function
XXXX	Maintenance Interval		Entry of maintenance interval between two services in days

4.8.4.3 Maintenance Password

Change of the code word for code level priority 3. With this code level, the date of service can be reentered.

Symbol	Description	Default	Function
****	Maintenance Password	****	**** = Definition of the individual 4 digit password (maintenance)

4.8.4.4 Average Function

The Gas Controller calculates the arithmetic average value for each active measuring point out of 30 measurements got within the time unit defined in the menu „AV-time“. This average is available for alarm evaluation besides the current value. The selection which value should be used for evaluation is defined separately for each alarm in the menu “Alarm Threshold X”. In the average mode, the average value is indicated in the menu “Measuring Values” next to the current value.

The alarm evaluation of the control mode “Average Value” is overlaid by the current value, when the current value exceeds the alarm threshold defined in the menu “AV-Overlay”. The overlay is delayed by the time factor defined in this menu. The average overlay function is only active for the gas type CO.

Symbol	Description	Default	Function
120 s 120 ppm	AV Overlay	120 s 120 ppm	sec. = Delay time of average value overlay ppm =Threshold for average overlay
900 s	AV Time	900 s	sec. = Time for calculating the average value

4.8.4.5 Power On Time

Gas sensors need a running-in period, until the chemical process of the sensor reaches stable conditions. During this running-in period the current signal can lead to an unwanted triggering of a pseudo alarm. Therefore the Power On time is started at the Gas Controller after you have switched on the power supply. While this time is running out, the Gas Controller doesn’t activate alarms or UPS relays. The Power On status occurs on the first line of the starting menu.

Attention: During the phase Power On the controller is in "Special Mode" and doesn’t perform further functions beside the starting procedures. A count-down Power On time in seconds is shown on the display.

Symbol	Description	Default	Function
30s	Power On time	30s	XXX = Definition of the power On time (sec.)

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4.8.4.6 Collective Fault Message Error Time

Future option for use as a non-secure devices with allowed error delay.

4.8.4.7 Collective Fault Message Relay Duplication

An additional relay can be defined in this item in order to use another relay contact on activation of the collective fault message. The additional relay must not be used as SIL2 compliant collective fault signal. The reason for this limitation is that only the main collective fault signal disposes of an additional independent monitoring function ensuring the correct fault state of the relay in the event of total failure of the processor. The doubled signal isn't modified any more during this failure.

4.8.4.8 GC Address

GC module address for registration in the main bus operation for future extensions of the communication.

The description of the Main Bus interface can be read in a separate documentation.

Symbol	Description	Default	Function
1	GC Address	1	0-255 = GC address

4.8.4.9 Analog Output

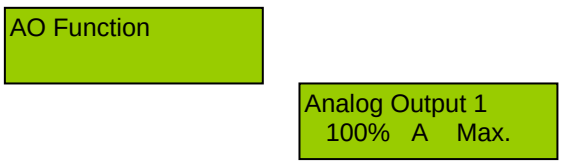
The Gas Controller Module as well as the EP modules 1 to 7 have got two analog outputs (AO) with 4 to 20 mA signal each. The signal of one or more measuring points can be assigned to each of the analog outputs. The assignment is done in the menu "MP Parameter" for each MP. The measuring point sends the current value signal to the analog output.

Out of the signals of all assigned measuring points the Gas Controller determines the minimum, the maximum or the average value and transmits it to the analog output. The definition, which value is transmitted, is done in the menu "Analog Output X".

To allow flexible air volume regulation of speed-controlled motors, the slope of the output signal can be adapted to the on-site conditions and varied between 10 - 100%.

As an alternative to the activation via the controller (defined by the number 1), the analog inputs can be assigned to the analog outputs of the same module EP (menu in the EP module). For this purpose, the number 10 - 100% has to be entered on the EP module.

Symbol	Description	Default	Function
Analog Output 1	Selection of channel		Selection of the analog output 1-16
0 1 10-100 %	Selection of output signal	100 %	0 = Analog output is not used (therefore de-activated response monitoring) 1 = Local application (not used in the central control) Selection of signal slope- permitted range 10 – 100 % 100 % gas signal control = 20 mA 10 % gas signal control = 20 mA (high sensitivity)
A	Selection of source	A	C = Source is current value A = Source is average value
Max.	Select Output mode	Max.	Min. = Displays the minimum value of all assigned MP Max. = Displays the maximum value of all assigned MP Average = Displays the average value of all assigned MP



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4.8.4.10 Relay Multiplication

With the relay multiplication table, it is possible in the GC-06 system to assign additional relay functions to an alarm. This corresponds to one multiplication of the source alarm situation per entry in the end.

The additional relay follows the alarm status of the source, but uses its own relay parameters to allow different needs of the doubled relay. So the source relay can be configured, for example, as safety function in de-energized mode, but the doubled relay can be declared with flashing function or as horn function.

There is a maximum of 20 entries for IN relays and OUT relays. Thus it is possible, for example, to expand one relay to 19 others or to double max. 20 relays.

In the column IN (source), the relay assigned to an alarm in the menu MP Parameter is set.

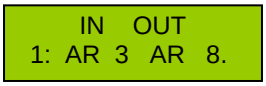
In the column OUT (target), the additionally needed relay is entered.

Note:

Manual intervention in the menu Relay Status or Override external ON or OFF by external DI do not count as alarm status, so they do only affect the relay IN. If this is also desired for the OUT relay, it has to be configured separately for each OUT relay.

Number	Description	Default Status	Function
0-30 0-96	IN AR Relay IN SR Relay	0	0 = Function off X = Relay X should be multiplied (information source)
0-30 0-96	OUT AR Relay OUT SR Relay	0	0 = Function off X = Relay X (target) should switch together with In-Relay.

Example 1:
3 relay contacts are needed with the same effect of relay 3. (See assignment of the relays in chapter MP Parameter)
Entry: 1: IN AR3 OUT AR7
Entry: 2: IN AR3 OUT AR8



If relay 3 is activated via an alarm, relays AR3, AR7 and AR8 switch at the same time.

Example 2:
2 relay contacts each are needed from 3 relays (for ex. AR7, AR8, AR9).
Entry: 1: IN AR7 OUT AR12 (Relay 12 switches at the same time with relay 7)
Entry: 2: IN AR8 OUT AR13 (Relay 13 switches at the same time with relay 8)
Entry: 3: IN AR9 OUT AR14 (Relay 14 switches at the same time with relay 9)

This means that relay AR7 switches with AR12;
AR8 with AR13; AR9 with AR14.
The two examples can be mixed up, too.

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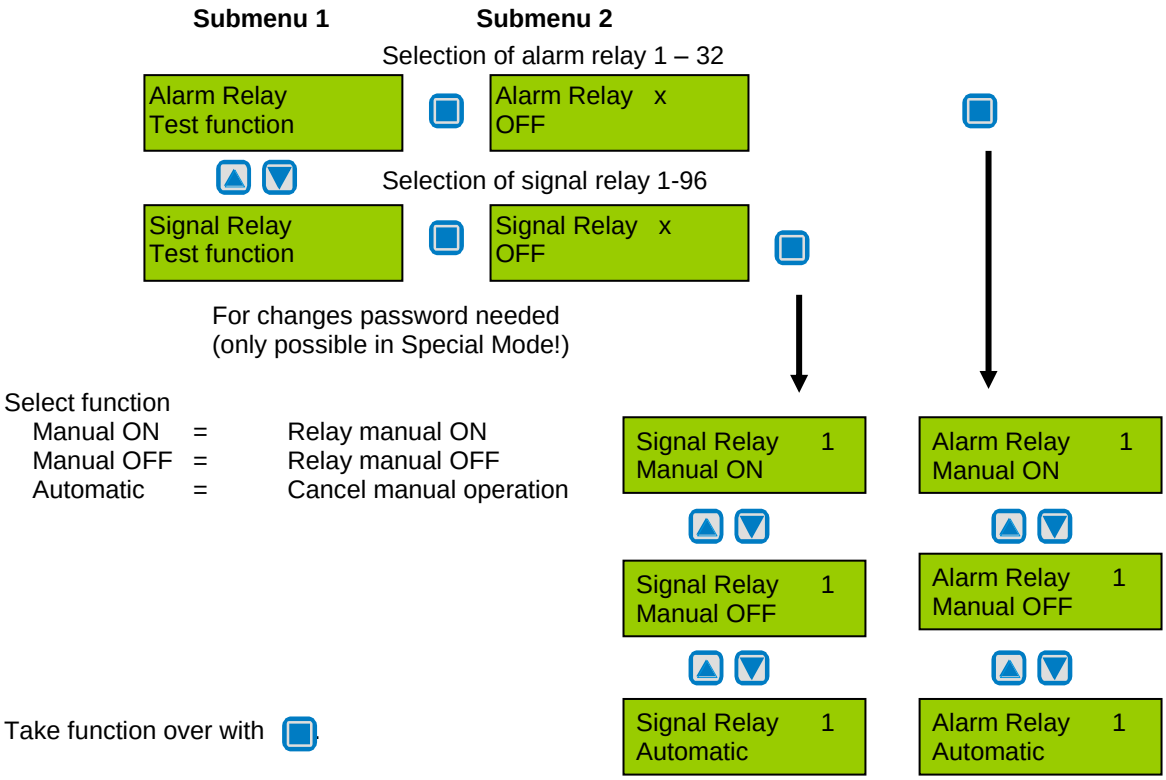
4.8.5 Test Function of the Alarm and Signal Relays



The test function sets the target device (selected relay) in Special Mode and activates a timer that re-establishes the normal measurement mode after 15 minutes and ends the test function.

Therefore the yellow LED on the controller is on in the manual ON or OFF status.

The external operation of the relays via an assigned digital input has priority to the manual test function in this menu item.

Symbol	Description	Default	Function
AR Status	Relay Nr. X		X = 1 – 32 Select alarm relay
SR Status	Relay Nr. X		X = 1 – 96 Select signal relay
OFF	Relay Status	OFF	OFF = Relay OFF (no gas alarm) ON = Relay ON (gas alarm) Manual OFF = Relay manual OFF Manual ON = Relay manual ON Automatic = Relay in automatic mode

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5 Notes and General Information

It is important to read this user manual carefully in order to understand the information and instructions. The PolyGard® GC-06 gas monitoring, control and alarm system may only be used for applications in accordance to the intended use. The appropriate operating and maintenance instructions and recommendations must be followed.

Due to permanent product developments, MSR reserves the right to change specifications without notice. The information contained herein is based on data considered to be accurate. However, no guarantee or warranty is expressed or implied concerning the accuracy of these data.

5.1 Intended Product Application

The PolyGard® GC-06 is designed and manufactured for controlling, for saving energy and keeping OSHA air quality in commercial buildings and manufacturing plants.

5.2 Installer's Responsibilities

It is the installer's responsibility to ensure that all PolyGard® GC-06 are installed in compliance with all national and local regulations and OSHA requirements. All installation shall be executed only by technicians familiar with proper installation techniques and with codes, standards and proper safety procedures for control installations and the latest edition of the National Electrical Code (ANSI/NFPA70).
The equipotential bonding required (also e.g. secondary potential to earth) or grounding measures must be carried out in accordance with the respective project requirements. It is important to ensure that no ground loops are formed to avoid unwanted interference in the electronic measuring equipment.
It is also essential to follow strictly all instructions as provided in the user manual.

5.3 Maintenance

We recommend checking the PolyGard® GC-06 system regularly. Due to regular maintenance differences in efficiency can easily be corrected. Re-calibration and replacement of parts can be realised on site by a qualified technician with the appropriate tools. Alternatively the removable Gas Controller can be returned to MSR-Electronic GmbH for services.

5.4 Limited Warranty

MSR warrants the PolyGard® GC-06 against defects in material or workmanship for a period of one (1) year beginning from the date of shipment. Should any evidence of defects in material or workmanship occur during the warranty period, MSR will repair or replace the product at their own discretion, without charge.

This warranty does not apply to units that have been altered, had attempted repair, or been subjected to abuse, accidental or otherwise. The above warranty is in lieu of all other explicit warranties, obligations or liabilities.

This warranty extends only to the PolyGard® GC-06. MSR-Electronic GmbH shall not be liable for any incidental or consequential damages arising out of or related to the use of the PolyGard® GC-06.

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